What is Claimed is:

1. An optical head that irradiates an optical disk with a flux of light from a laser light source through an objective lens comprising:

a lens holder holding an aberration correction lens in a space between the laser light source and the objective lens;

a drive shaft disposed to extend in a direction parallel to an optical axis of the flux of light, the drive shaft guiding the lens holder in the extended direction;

a piezoelectric element provided at an end portion of the drive shaft, the piezoelectric element being capable to extend and contract in a drive shaft direction in response to an applied voltage; and

a position detection portion detecting a position of the aberration correction lens in the drive shaft direction,

wherein the lens holder is movable relatively with respect to the drive shaft in the drive shaft direction by varying a change rate when the applied voltage to the piezoelectric element is increased and decreased.

2. The optical head according to Claim 1, wherein:

a voltage that gives a rise to a change causing the drive shaft to slide with respect to the lens holder and a voltage that gives a rise to a change causing the drive shaft to move integrally with the lens holder are repetitively applied to

the piezoelectric element.

3. The optical head according to Claim 1 or 2, wherein:

the position detection portion includes a magnetic field generation portion and a magnetic field detection portion disposed to be allowed to undergo displacement with respect to the magnetic field generation portion in the optical axis direction.

4. The optical head according to Claim 3, wherein:

the drive shaft is supported on a base having a bottom portion, the magnetic field detection portion disposed so as to protrude from the bottom portion of the base.

5. The optical head according to Claim 3 or 4, wherein:

more than one magnetic field detection portion is disposed in a line along the drive shaft direction.

6. The optical head according to any one of Claims 3 through 5, further comprising:

a correction magnetic field detection portion provided at a position unsusceptible to a magnetic field generated by the magnetic field generation portion in such a manner that a direction of magnetic field sensitivity is aligned with a direction of magnetic field sensitivity of the magnetic field

detection portion.

7. The optical head according to Claim 6, wherein:

a correction magnetic field generation portion is provided adjacently to the correction magnetic field detection portion.

8. The optical head according to any one of Claim 3 through 7, further comprising:

an auxiliary guiding shaft made of a soft magnetic body, the auxiliary guiding shaft disposed parallel to the drive shaft,

wherein the magnetic field generation portion is disposed at a position at which a direction heading from the magnetic field generation portion to the auxiliary guiding shaft becomes perpendicular to the drive shaft.

9. The optical head according to any one of Claims 1 through 8, wherein:

the lens holder comes in contact with the drive shaft via a frictional holding body.

10. The optical head according to any one of Claims 1 through 9, wherein:

the drive shaft is disposed parallel to the optical disk;

the optical head further comprises an auxiliary guiding shaft disposed parallel to the drive shaft and a mirror that deflects a flux of light from the laser light source in a direction of a normal to the optical disk; and

the mirror is disposed in a space between the aberration correction lens and the objective lens and also in a space between the drive shaft and the auxiliary guiding shaft.

11. The optical head according to any one of Claims 1 through 10, wherein:

the frictional holding body is made of a resin material containing a fluorine-based compound or fluorine-based resin.

12. The optical head according to any one of Claims 1 through 11, further comprising:

a temperature sensor that detects a temperature of the optical head.

13. The optical head according to any one of Claims 1 through 12, wherein:

the aberration correction lens corrects spherical aberration.

14. An optical disk device comprising:

the optical head according to any one of Claims 1 through

13; and

a control portion that adjusts an applied voltage to the piezoelectric element according to a detection result on the optical head by the position detection portion.

15. The optical disk device according to Claim 14, wherein:

the control portion is configured to be capable of acquiring disk identification information provided to the optical disk; and

the optical disk device further comprises a storage portion that stores a set position of the aberration correction lens in response to the disk identification information.

16. An optical disk device comprising:

the optical head according to Claim 6; and

a control portion that adjusts an applied voltage to the piezoelectric element according to a detection result on the optical head by the position detection portion,

wherein the control portion is configured to correct a set position of the aberration correction lens according to a detection result on the optical head by the correction magnetic field detection portion.

17. The optical disk device according to Claim 16,

wherein:

the optical head includes a correction magnetic field generation portion provided adjacently to the correction magnetic field detection portion.

18. An optical disk device comprising:

the optical head according to Claim 12; and

a control portion that adjusts an applied voltage to the piezoelectric element according to a detection result on the optical head by the position detection portion,

wherein the control portion is configured to correct a set position of the aberration correction lens according to a temperature detected by the temperature sensor.